

CROP BYPRODUCTS

Making use of the leftovers

Byproducts are materials left over from food production. They are generated at the farm level or during **food processing** when food is prepared for human consumption. Byproducts are not the primary goal of the agricultural system but are a critical part of the food production cycle, and are often nearly as important as the main product.

Food waste and food loss refers to the decrease in the food quality or quantity resulting from the actions of people along the food chain: farmers, retailers, food service providers and consumers.² Unused food contributes to greenhouse gases (GHGs), overwhelms landfills, adds to food costs and contributes to world hunger.

PLANTS & ANIMALS – A MUTUALLY BENEFICIAL RELATIONSHIP

Not all food produced in Canada is suitable for people to eat. However, often what remains can be used as ingredients for animal feed.

Byproducts used as animal feed contain protein, energy and high-quality fibre that humans cannot effectively digest, but are excellent for **livestock**, like cattle, pigs and poultry. In turn, livestock provide manure to fertilize crops.

PREVENTING WASTE

Byproducts are critical for reducing food waste and food loss. Repurposing agricultural waste provides an additional income for farmers using the same energy and land without impacting food production.¹

DYK? Feeding grain to livestock creates an alternate market for crops damaged by insects, disease, frost, drought or other weather conditions. Without livestock, grains that aren't human food quality would be wasted. Without crop byproducts, livestock feed would be more expensive, which would result in making animal proteins for humans more costly too.

Fruits & vegetables

Byproducts from fruits and vegetables (peels, seeds, leaves, pulp, stems and stones) are rich in nutrients.⁶ Research shows potential for adding natural compounds from fruits and vegetables to processed foods as sources of fibre or minerals,⁷ food preservatives or to improve texture or colour.^{8,9}

Other crops, other uses

In Canada, most of the sugar we use comes from sugar beets. After the sugar is removed, the remaining pulp is often sold for animal feed. De-sugared beet molasses is used as a de-icing product for roads and bridges in parts of Canada.¹⁰

Cellulose (the main substance found in plant walls) offers a biodegradable, renewable replacement for synthetic fibres in clothing, household goods and industrial manufacturing. These are called **biofibres**. Hemp and linen are examples of mass-produced biofibres that are currently being used in the clothing industry.

Hundreds of different fibrous plants, including wheat, hemp and flax, have potential to be manufactured into paper products.^{11,12}

Researchers are looking into hemp's potential as a bioplastic to replace fossil fuel-based plastics.¹³

Hemp



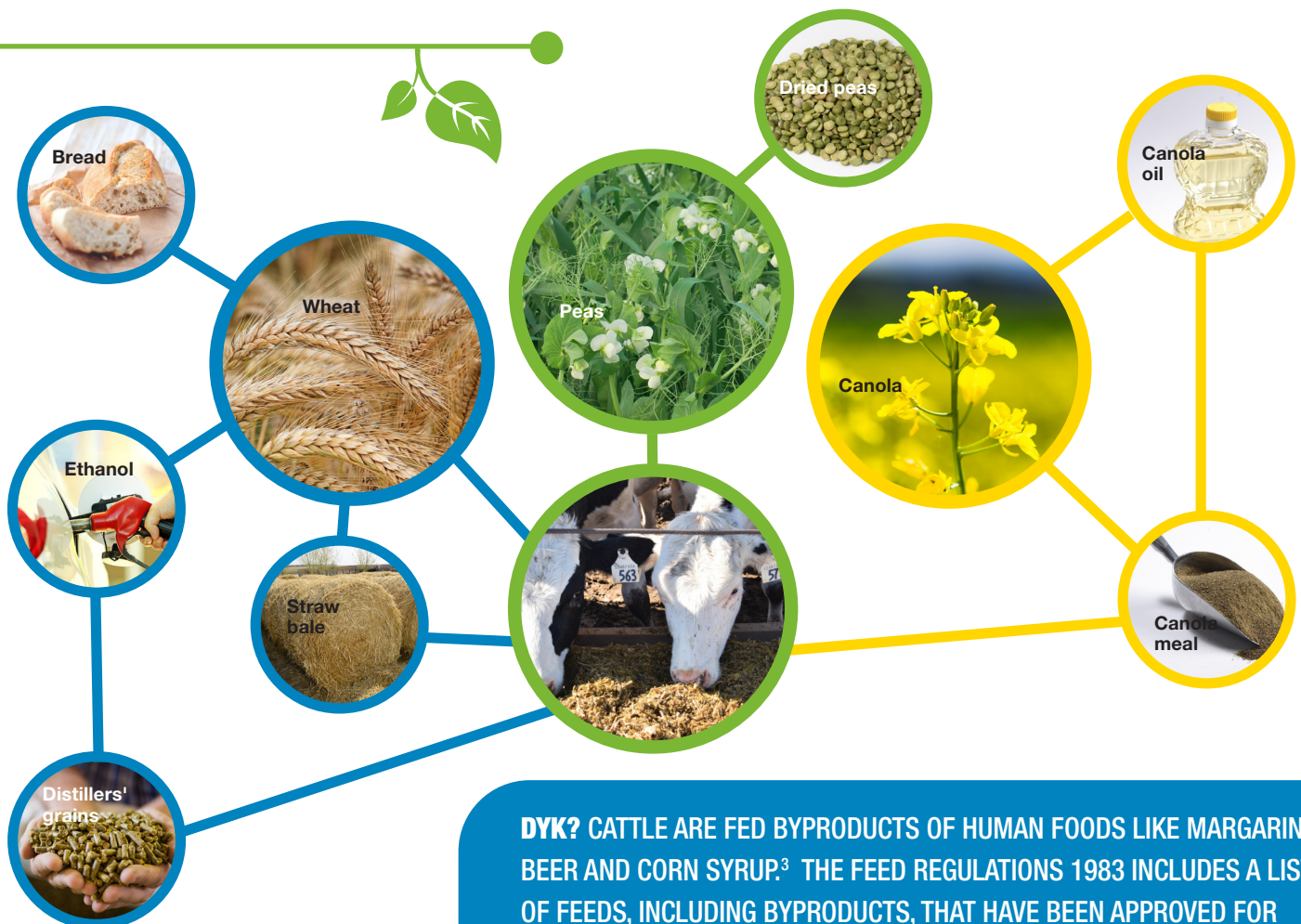
Grain & oilseed crops



In Canada, almost all parts of cereal and grain crops are used.

- Seeds from **cereal crops** (wheat, barley and oats) are used for making foods like bread, breakfast cereals and pasta. We also eat the seed portion of **pulses** (peas, beans and lentils) and use the oil from **oilseeds** like canola and soybeans for cooking. What is left over has other purposes.
- **Chaff** (seed pods, plant stems and other debris removed during harvesting) can be added to livestock feed to reduce costs.
- **Straw** (fibrous stalks of cereal crops) can be used to build organic matter in soil or made into bales and used as bedding for livestock.

- **Meal** (what's left after oil is extracted from oilseeds) is used in feed for nearly all types of livestock: beef and dairy cattle, swine, horse, small ruminants (sheep and goats), camelids (alpacas and llamas), pheasants, quail, game birds and ostriches.
- **Ethanol** (a liquid alcohol made from fermenting sugar or starch found in grains like corn or wheat) can be blended with gasoline to help reduce greenhouse gas (GHG) emissions from vehicles.
- **Distillers' grains** (a byproduct from grain-based ethanol production) is an excellent source of nutrients for livestock.⁵



DYK? CATTLE ARE FED BYPRODUCTS OF HUMAN FOODS LIKE MARGARINE, BEER AND CORN SYRUP.³ THE FEED REGULATIONS 1983 INCLUDES A LIST OF FEEDS, INCLUDING BYPRODUCTS, THAT HAVE BEEN APPROVED FOR LIVESTOCK.⁴